Spectrally and spatially resolved lasing emission of an optically pumped Photonic Crystal : evidence of a 2D lasing mechanism

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Lasing in a full Photonic Crystal (PhC) is achievable through several feedback mechanisms according to the photonic gap involved. Some are akin 1D Distributed FeedBack “classically” implemented in DFB lasers, operating on a single direction of the PhC, and one is specific to the 2D PhC as it relies on a feedback mechanism which involves both directions, as clearly explained in [1].

We have measured lasing operation on a 2D PhC fabricated on a two wells+ cladding structure etched by CAIBE [2] . The lasing spectrum exhibits 2 lines which are not related to the finite size of the PhC, but could be attributed to the modal degeneracy close to the K point of the upper band. We also measured the spatial distribution of the emitted power. These measurements are discussed with respect to calculated dispersion curves and mode field distributions.

[1] M. Notomi, H.Suzuli and T.Tamamura , **Appl. Phys. Lett., 78**, 1325 (2001)
[2] M.Mulot, S.Anand, M.Swillo, M.Qiu, B.Jaskorzynska and A.Talneau, **Jour. Vac. Sci and Technol., B, 21**(2), 900 (2003)